

REMARKS

Claims 30 to 34, 36 and 37 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sugiura et al. (US 2001/0022134) in view of Fujita (US 6,321,635). Claim 35 was rejected under 35 U.S.C. §103(a) as being unpatentable over Sugiura et al. and Fujita et al. as applied to claim 30 above, in further view of Ishizuka (US 4,379,425). Claim 38 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 39 to 48 are allowed.

Reconsideration of the application based on the following remarks is respectfully requested.

Rejections under 35 U.S.C. §103(a)

Claims 30 to 34, 36 and 37 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sugiura et al. (US 2001/0022134) in view of Fujita (US 6,321,635).

Sugiura et al. discloses a method and apparatus for producing a hollow piston for a compressor by forging. The piston includes “a head portion which is slidably fitted in a cylinder bore of the compressor and the engaging portion which engages a reciprocating drive device for the compressor.” (See Abstract lines 2 to 5). “The two opposed lateral walls of the U-shape of the engaging portion have respective recesses which are opposed to each other. Each of these recesses is defined by a part spherical inner surface of the lateral wall. The pair of shoes...are held in contact with the opposite surface of the swash plate at its radially outer portion and are received in the respective part spherical recesses. Thus, the engaging portion slidably engages the swash plate through shoes.” (Page 6, paragraph [0064], lines 9 to 18).

Fujita discloses a swash plate type compressor comprising “a cylinder block defining a cylinder bore, a piston inserted in the cylinder bore to have a sealed gap around the piston and reciprocating to compress the gaseous fluid, the gaseous fluid having a part which passes as a blowby gas through the sealed gap when the piston is reciprocated, a swash plate rotatably driven, a shoe mechanism slidably interposed between the swash plate and the piston for converting a rotating motion of the swash plate to a reciprocating motion of the piston, and supply means connected to the sealed gap for supplying the blowby gas together with the

lubricating oil to the shoe mechanism to lubricate a sliding portion which is between the shoe mechanism and each of the swash plate and the piston.” (Col. 2, lines 3 to 16).

Claim 30 recites “an axial piston machine comprising:

at least one piston having a substantially cylindrical piston body, and a brace configured to receive at least one of a tilting ring and a tilting plate and piston shoes slidably disposed on the at least one of the tilting ring and the tilting plate, wherein the brace includes spherical cap-shaped depressions for receiving the piston shoes, the depressions being located on a first side of the brace adjacent the piston body and on a second side of the piston brace opposite the first side, wherein the substantially cylindrical piston body and the brace are separate parts assembled together to form the piston, wherein the brace has an opening on the second side of the piston brace, opposite the piston body.”

Sugiura et al. admittedly fails to teaches or show, “wherein the brace has an opening on the second side of the piston brace, opposite the piston body,” as recited in claim 30. Sugiura et al. does not have openings in the brace. Furthermore it would not have been obvious to one of skill in the art to modify Sugiura et al. in view of Fujita. The openings in the present invention allow the spherical shape of the spherical cap-shaped depressions to be produced by rotating the piston about the axis of the piston body, that is, about the cylinder axis. This allows the spherical cap shapes to be produced by turning on standard lathes, therefore reducing the cumbersome methods, materials, costs and errors typically associated with special machines. (Specification paragraphs [0007], [0013], and [0041], for example). The openings in Fujita do not serve this purpose and do not assist in the production of the spherical cap shapes.

Withdrawal of the rejection of independent claim 30 under 35 U.S.C. §103(a) and dependent claims 32 to 34, 36 and 37 is respectfully requested.

Claim 35 was rejected under 35 U.S.C. §103(a) as being unpatentable over Sugiura et al. and Fujita et al. as applied to claim 30 above, in further view of Ishizuka (US 4,379,425)

Sugiura et al. is discussed above.

Fujita et al. is discussed above.

Ishizuka discloses a “double-acting piston compris[ing] a pair of piston heads provided at opposite ends thereof and an intermediate coupling member interposed between the piston heads

to couple same to each other.” (Col 2, lines 2 to 5). “The first parts of the piston heads have opposed inner ends spaced from each other and cooperating with the intermediate coupling member to define therebetween a central recess opening radially inwardly of the compressor and in which the swash plate has its peripheral fringe engaged via shoes.” (Col. 2, lines 16 to 22).

In light of the discussion above, it is respectfully requested the rejection of dependent claim 35 be withdrawn.

Furthermore, with respect to claim 35, one of skill in the art would not have found it obvious to combine Sugiura et al., Fujita et al. and Ishizuka. There is no motivation to combine Sugiura et al., Fujita et al. and Ishizuka.

Withdrawal of the rejection of claim 35 under 35 U.S.C. §103(a) is respectfully requested.

Allowable Subject Matter

Claim 38 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In light of the discussion above, withdrawal of the objection to claim 38 is respectfully requested.

CONCLUSION

It is respectfully submitted that the application is in condition for allowance and applicants respectfully request such action.

If any additional fees are deemed to be due at this time, the Assistant Commissioner is authorized to charge payment of the same to Deposit Account No. 50-0552.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By: 

Cary S, Kappel, Reg. No. 36,561

Davidson, Davidson & Kappel, LLC
485 Seventh Avenue - 14th Floor
New York, New York 10018
(212) 736-1940